SIR OLIVER LODGE, D.Sc., F.R.S., died on the 22nd August, 1940, in his 90th year. His death deprives us of a kindly leader, and it recalls innumerable successive phases of the advance in physics that he strove to elucidate and to enthrone in the realm of hypothesis. At a critical stage of his life, when natural knowledge became for him too circumscribed, he sought adventure in an abstruse field of research where evidence was more difficult to analyse and to appraise than had been the case along the normal path of repeated observation and measurement that had led him to success in his early physical investigations. Although his activities were, by this digression, somewhat diverted, he never lost his hold upon what the laboratory and mathematical science could reveal of the material universe. In whatever direction his work might take him, he exerted gracious influence. Better than any man of his time, he could put into a few crisp phrases the essentials of a recondite argument that would charm a mixed audience into attention and win their approbation and their smiles.

He was born on the 12th June, 1851, at Penkhull, near Stoke-on-Trent, the eldest son of Oliver Lodge of Wolstanton, who gave him the additional name Joseph.

The lad was sent to Newport Grammar School until he was 14, when he found a place in industrial life with his father. With a strong bent for learning, but with no opportunity for obtaining the advantages of instruction in a residential university, he climbed step by step up the ladder provided by the University of London, early gaining first-class honours in physics. Ultimately he abandoned the idea of a business career, and entering University College, London, took his degree of D.Sc. in June, 1877.

Following upon this success, he was appointed assistant professor at University College. He also gave lectures on physics to young women, at Bedford College, which at that time was in York Place, Baker Street. The college possessed a gold-leaf electroscope, a Leyden jar, and some primitive apparatus for demonstrating hydrostatics; and in an adjacent room Pickering had made an excellent beginning with a corresponding chemical laboratory. In 1881, however, Lodge was called to Liverpool, and his lectureship at Bedford College passed into the care of Prof. F. D. Brown, of Oxford. From Liverpool, he transferred his activities, in 1900, to Birmingham, as principal of the new university of that city. In 1919 he relinquished his professorial work and made his home at Normanton, near Salisbury, a centre for literary labour and scientific and other research.

A cardinal event in his career was his discourse on the 1st June, 1894, at the Royal Institution, on wireless telegraphy. The untimely death of Heinrich Hertz in January of that year, at the early age of 37, had cast gloom over the scientific world. Lodge paid a high tribute to him and proceeded to expound the principles of wave transmission that Hertz had demonstrated. He described briefly the apparatus that Hertz had constructed, including the radiator and the receiver, and referred to his own experiments that followed. This discourse was published, with additions, in his " Signalling through Space without Wires." He explained that transmission of electrical waves through wires had been known for several years, and that the special discovery by Hertz in 1887 and 1888 was transmission of such waves through free space.

In 1889, there appeared his " Modern Views of Electricity," his most valuable contribution to electrical literature. It was a review of the state of knowledge and speculation, at that time, concerning conduction, radiation, magnetism and the constitution of matter, related to ether theory and the phenomena of radio activity. There was then, as now, a demand for a mechanical model of the universe. Things were precisely as P. G. Tait had depicted them in 1880 when he complained that no experimenter had yet verified the existence of " that wonderful elastic jelly which we *know* must fill all space without offering perceptible resistance to bodies moving in it—that jelly whose inconceivably rapid quivering is the mechanism by which comes to us continuously from the sun that supply of energy without which life must at once cease from the earth." It had been an object of Clerk Maxwell to reduce electric and magnetic phenomena " to stresses and motions of the ethereal jelly," and towards this end Lodge shaped his course.

Immediately following upon the discovery of the transmission of electric waves through free space, Hertz was approached by his contemporaries and was asked if his results could be applied to signalling. In 1889, Hertz wrote to Huber and pointed out that the application would require a mirror as large as a continent. To Lodge, however, the difficulties did not appear to be insuperable; it is recorded by Campbell Swinton that, in 1894, at the lecture at the Royal Institution, Lodge " went so far as to ring a bell by this means from one end of the building to the other, through the thickness of several partition walls." Moreover, it was Lodge who applied the name " coherer " to a loose-contact device that exhibits the phenomenon of contact-making by a spark, a phenomenon that was already familiar to David Hughes.

The same circumstances throw light upon the sequence of discoveries with regard to " tuning." In his investigation of detectors and for his wavelength measurements, Hertz of course tuned his circuits, but he left it to Lodge and others to apply tuning to signalling and to telegraph circuits for wireless transmission. The part that Lodge, Muirhead and Robinson took in this development is stated by Sir Ambrose Fleming in " The Principles of Wave Telegraphy and Telephony." It may be remarked that Robinson, who had long acted as an assistant to Lodge, had been trained in laboratory arts in the physics and chemistry laboratories at Coopers Hill College, as an assistant to Prof. Herbert McLeod, F.R.S., one of the most skilful manipulative physicists since Michael Faraday.

As an example of the work of Lodge in electrochemistry, there is his apparatus for demonstrating the migration of ions. It consists of a horizontal glass tube with turned-down ends dipping into separate beakers of dilute acid. The tube is filled with jelly dyed with phenolphthalein. When a current is passed, hydrogen ions from an anode discolourize the dye, and a boundary surface is seen to advance along the tube. Of his further activities, it suffices to remind ourselves of his numerous contributions to our *Journal*, particularly his two Kelvin Lectures in 1914 and 1928 respectively, and to direct attention to references to him in the " History " of our Institution. He was elected a Member in 1889, a Vice-President in 1902–1904, and an Honorary Member in 1924; and he received the Faraday Medal in 1932. He was Chairman of the Birmingham Local Section (now South Midland Centre) in 1902–1904.

It is in his two small books, " Atoms and Rays " and " Advancing Science," that he tells of his varied achievements and of his association with his contemporary pioneers. There is an account of his early investigation of " dust " that brought him into prominence, and a running commentary upon the work of the British Association, to which, from 1870 to 1931, he so effectively contributed.

He was elected a Fellow of the Royal Society in 1887 and was knighted in 1902. He was Romanes Lecturer at Oxford in 1903, president of the Physical Society in 1899–1900, and of the British Association in 1913. In 1877 he married Mary, the daughter of Alexander Marshall; she died in February, 1929. They had six sons and six daughters. His brother Alfred, the mathematician, was known to electrical students of the last

century for his work on hyperbolic functions. A Memorial Service to Sir Oliver Lodge was held at the church of St. Margaret, Westminster, on the 3rd September, 1940. And thus he rests from his labours.

R. A.